

Chapter 2: Heritage Resources



View of Maui from Upper Kula.

M*au*i’s archaeological landscapes, ethnic diversity, historic structures, and rare ecosystems collectively define the island and make it unique. The combination of royal fishponds, burial sites, historic sugar mills, churches, vibrant rainforests, endemic species, and spectacular views tell the tale of a mix of cultures and their relationship with the surrounding natural environment. A tenet of environmental stewardship is sustainability, which refers to the ability of mankind to “meet the needs of the present without compromising the ability of future generations to meet their own needs.” Human interactions with the natural elements provide challenges and opportunities for further natural resource protection.

CULTURAL, HISTORIC, AND ARCHAEOLOGICAL RESOURCES

Maui is an island rich in history, culture, and traditions. Beginning with the arrival of voyaging Polynesians, and progressing through time to the modern day, Maui has developed into a diverse community. The island's archaeological artifacts, folklore, historic buildings, landscapes, people, traditions, languages, and lifestyles are all a part of its history. Cultural, historic, and archaeological resources provide us with a connection to the past and a sense of identity and place. They inform us of our history and provide us with an understanding of Maui's people, past and present.



Wo Hing Society Hall, Lahaina.

Background Information

Beginning with the early Hawaiians, Maui has become home to people from across the globe. Each group has made its mark on the island. The early Hawaiians arrived more than a thousand years ago by voyaging canoes from Central Polynesia. They brought with them their language, traditions, and lifestyles. Maui's culture today is rooted in Hawaiian traditions – the Aloha Spirit, the Hawaiian language, hula, surfing, and the beauty and spirit of the land.



*Maui's Cultural
Resources
Provide a Sense
of Identity*

Banyan Tree Park, Lahaina.

Western explorers arrived in Hawai'i using modern tools of navigation and sailing. They arrived to Hawai'i as sandalwood traders, whalers, and in 1820 as missionaries. Around these economic activities, small towns developed to provide goods and services. American and European institutions, traditions, and culture became rooted in Hawai'i during the rapidly changing period of the 19th century.

With the massive growth of the plantation industry, the need for labor also grew, resulting in the importation of workers from Asia, Europe, South and Central America, and the South Pacific Islands. This influx created incredible ethnic and cultural diversity within the County.



Pu`unēnē.

As a result of Maui’s Native Hawaiian history spanning more than a thousand years, and its more recent multi-ethnic history, the island is rich in archaeological and historic sites. The preservation of cultural landscapes encourages the perpetuation of traditional practices. Historic and archaeological resources are also important to Maui’s economy. Hawaiian archaeological sites and post-contact historic places provide a visitor experience found nowhere else.

The Countywide Policy Plan, at page 49, establishes the following goal: “Maui County will foster a spirit of pono and protect, perpetuate, and reinvigorate its residents’ multi-cultural values and traditions to ensure that current and future generations will enjoy the benefits of their rich island heritage.”

Each part of Maui has a mix of cultural resources. Table 2-1 summarizes Maui’s resources in the context of the island’s six community plan areas.

Table 2 - 1: Maui's Cultural, Historic, and Archaeological Resources by Community Plan Area

Community Plan Area	Cultural, Historic, and Archaeological Resources
Hana	This area is characterized by its vast natural areas, wealth of Hawaiian history, agricultural lands, and rural communities. Hawaiian history and folklore are central to the identity of this area. Many Hawaiian royalty and ali'i originated from this area, including Queen Ka'ahumanu. Hawaiian cultural resources, including lo'i kalo, heiau, burial sites, battle grounds, and ancient trails are abundant in this area. The area remained largely isolated until the completion of the Hana Belt Road in 1926 under the direction of a Chinese county engineer named Paul Low. The area was and remains a taro growing district and had plantations established for the production of rubber and sugar cane. There are Hawaiian, Chinese, Portuguese, Japanese, Filipino, and Euro-American graveyards located in the area.
Wailuku-Kahului	Cultural resources of this area are dominated by the sugarcane industry, though this area is also rich with Hawaiian cultural resources. This area was home to many of Maui's ali'i, including Kahekili, Maui's most powerful chief. 'Īao Valley is the site of one of the most famous battles in Hawaiian history, where King Kamehameha I defeated the Maui army in an effort to unite the Hawaiian Islands. The Wailuku Historic District's landmarks, civic center, and commercial buildings along High, Main, Market, Church, and Vineyard Streets stand as unique reminders of the island's cultural identity and history. The Kahului Railroad, the first and last railroad in Hawai'i to begin and end operations, was based at the Port of Kahului. A large taro-producing district was located in nearby Waihe'e in the early 1900s, and was worked by Hawaiians, Chinese, and at least one African-American farmer. There are Hawaiian, Chinese, Portuguese, Japanese, Korean, Filipino, and Euro-American graveyards located in the area.
Makawao-Pukalani-Kula	The history of the Hawaiian cowboy, or paniolo, is prominent in places such as Haleakalā Ranch and 'Ulupalakua Ranch. Remnants of Chinese history can also be found in Sun Yat-sen Memorial Park and in this area at the Ket Hing Society of which Sun Yat-sen, his brother, Sun Mei, and their families were members. Hawaiian, Chinese, and Portuguese homesteads are located in the area along with a number of Hawaiian, Chinese, Portuguese, Japanese, Filipino, and Euro-American graveyards.
Kīhei -Mākena	The cultural resources of this area are closely tied to its coastal resources. Fishing villages were prominent in this region and several fishponds still remain along the coast. Within the southwestern end of the Kīhei-Mākena Community Plan Area is a mix of archaeological resources, including Hawaiian burial sites, fishing shrines, heiau, and shelters. Also within this portion of the region is Keone'ō'io, where the French explorer, Jean-Francois de Galaup, Comte de La Perouse, first mapped Maui's South shore and recorded his observations of Hawaiian culture. South Maui also played an important role in the cattle-ranching community during the 1800s and first half of the 1900s.
Pa'ia-Ha'iku	This area's importance in Hawaiian oral history is indicated by the numerous references to landings, battles, and visits conducted here by various ali'i nui. This area was also the location of numerous heiau, reflecting the presence of both locally and regionally powerful chiefs, as well as a sizable population to provide labor for the building of the structures. During much of the 19 th and 20 th centuries, vibrant plantation towns existed in this area. The sugar and plantation industries and their employees utilized a railroad line that originated in Kahului and terminated in Ha'iku. Remnants of the old railroad track remain in Pa'ia Town, which was once the island's commercial hub. There are several Hawaiian, Chinese, Portuguese, Japanese, Filipino, Euro-American, and African-American graveyards that still exist in the area. The site of the only known turn-of-the-century African-American settlement in Maui County is located at Spreckelsville.

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Community Plan Area	Cultural, Historic, and Archaeological Resources
West Maui	<p>As the former capital of Hawaiʻi, Lahaina was the residence of Hawaiian kings and the location where many key Hawaiian governmental decisions were made during the 19th century. Lahaina’s identity as a major seaport made it central to the whaling industry in the Pacific. Lahaina was also home to many influential missionaries who had a profound effect on the culture of the island. The Lahaina Historic Districts I and II, the Lahaina National Historic Landmark District, and Mokuʻula signify the importance of this area’s rich cultural history. The southern end of the West Maui Community Plan Area, including Launiupoko, Olowalu, and Ukumehame, contains significant remnants of pre-contact Hawaiʻi such as heiau, agricultural terraces, and petroglyphs. North of Lahaina, toward the wetter end of the area, streams were extensively used for irrigated kalo cultivation by Hawaiians. The sugarcane industry and the pineapple industry also have had a strong presence in this area. Puʻukoliʻi, once the largest sugar plantation camp in West Maui, was located mauka of Kāʻanapali, and several Hawaiian, Chinese, Portuguese, Japanese, Korean, Filipino, and Euro-American graveyards still exist in the area.</p>

CHALLENGES AND OPPORTUNITIES

Perpetuation of Cultural Practices and the Hawaiian Language

In recent years, the development of shopping malls, fast-food chain stores, and tract housing have given Maui the visual appearance of many Mainland communities. Maui has also lost several locally owned retail stores and restaurants that catered to the needs of island residents. While State and County programs exist to perpetuate the island’s cultural practices and traditions, additional support is needed to make them more effective. Maui’s Hawaiian culture, physical beauty, architecture, local cuisine, clothing, music, and customs make the island special and define its “sense of place.” By preserving Maui’s unique features, we can maintain the health of the visitor industry and economy.

The MIP aims to perpetuate the Hawaiian culture as the basic foundation in the lives of our residents.



Lo'i kalo.

Protection of Cultural, Historic, and Archaeological, Resources

Cultural programs, education, and the local arts need to be widely available to perpetuate the island's unique sense of identity. Educating residents about the value of cultural resources is essential to the preservation of these resources for future generations. Public schools and private organizations, such as the Maui Arts & Cultural Center, provide important venues for such education.

The legal protection of historic and archaeological resources is limited outside of the officially designated historic districts (in Lahaina and Wailuku), formally dedicated historic sites, and the Special Management Area. The many significant sites that exist outside of these areas should be afforded stronger protection.

The National Park Service accepts "Thematic Cultural Resource" nominations for inclusion on the National Register of Historic Places. Cultural resources can be grouped by ethnicity or other themes and publicized through "thematic cultural resource guides." As a valuable resource for the visitor industry, thematic cultural areas and accompanying guides could produce a source of funding for restoration and maintenance of historic sites.

Many cultural areas are made up of a mix of historical sites, archaeological complexes, and natural resources. These elements carry their full cultural significance when linked, protected, and interpreted together as a cultural landscape.

Kalo Kanu o Ka `Āina: A Cultural Landscape Study of Ke`anae and Wailuanui, Island of Maui (1996) makes recommendations for methods to preserve the cultural landscape in portions of the Hana Community Plan Area based on cultural resource inventories, land use management decisions, and actions that protect the community's rural lifestyles and vital natural resources.



Hale Ki'i, Wailuku.

The National Park Service administers the National Heritage Area (NHA) program. NHA designation encourages local residents, government agencies, nonprofit groups and private partners to collaboratively plan and implement programs and projects that “recognize, preserve, and celebrate” the applicable area’s physical and cultural landscape. There are currently 49 NHAs, although none can be found in Hawai‘i.

The Statewide Historic Preservation Plan for the State of Hawaii (2001) and the Cultural Resources Management Plan for Maui County (1984) provide numerous recommendations that, if implemented, would strengthen cultural resource management.

Geographic Information System technology provides tools to efficiently map the location of cultural sites. The Historic Resources Inventory and Mapping (2006) is one documented inventory of cultural resources. Interviews with knowledgeable cultural practitioners and kupuna across the island are also necessary.

Identifying and protecting historic and archaeological sites on private property can be especially challenging because of the need for support and cooperation from private landowners. Challenges include identifying unknown archaeological sites, encouraging owners to list sites on the State or National Register of Historic Places, and maintaining a database of listed sites.



Ke`anae Congregational Church, Ke`anae.

Island-wide Inventory of Historical Resources

Predictive maps could be developed from a comprehensive resource inventory to forecast undiscovered archaeological sites. In other communities, predictive maps have been used successfully to forecast the location of important archaeological and historical resource sites, thus allowing more effective resource preservation.

The development of incentive programs to encourage landowners to register, maintain, and improve historical and archaeological sites on their property would make voluntary preservation more attractive. Low-interest loans and tax incentives would provide incentives for restoring historic structures.

Maui County has established historic districts within Lahaina and Wailuku (Chapter 19.50, Maui County Code) to provide recognition and protection for historically significant structures. Similarly, establishing archaeological districts should protect areas with strong archaeological significance.

The Countywide Policy Plan, at page 51, establishes the following objective:

“Preserve and restore significant historic architecture, structures, cultural sites, cultural districts, and cultural landscapes.”



Ke`anae.

SUMMARY OF CULTURAL, HISTORICAL, AND ARCHAEOLOGICAL RESOURCES ISSUES

While some State and County programs exist to perpetuate island culture and protect historic and archaeological resources, additional support is needed to enable these programs to be effective. The following are a few of the many requirements to meet cultural-resource challenges:

- Preserve and restore Hawaiian cultural practices, places, and language
- Strengthen management programs to better protect historic and archaeological resources
- Develop island-wide inventories of historic and archaeological resources

GOAL, OBJECTIVES, POLICIES, AND ACTIONS

Goal:

- 2.1** Our community respects and protects archaeological and cultural resources while perpetuating diverse cultural identities and traditions.

Objective:

- 2.1.1** An island culture and lifestyle that is healthy and vibrant as measured by the ability of residents to live on Maui, access and enjoy the natural environment, and practice Hawaiian customs and traditions in accordance with Article XII, Section 7, Hawai'i State Constitution, and Section 7-1, Hawai'i Revised Statutes (HRS).

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Policies:

- 2.1.1.a** Perpetuate the spirit of aloha and celebrate the host Hawaiian culture and other ethnic cultures.
- 2.1.1.b** Perpetuate a respect for diversity and recognize the broad blending of cultures and ethnicities as vital to the quality of life on Maui.
- 2.1.1.c** Ensure traditional public access routes, including native Hawaiian trails, are maintained for public use.
- 2.1.1.d** Support the education of visitors and new residents about the customs and etiquette of the Hawaiian culture, as well as other cultures.

Implementing Actions:

- 2.1.1-Action 1** Provide staffing and funding to support cultural resource planning, strengthen enforcement, support cultural programs and educational activities, and utilize the generational knowledge of Native Hawaiian advisory bodies, when appropriate.
- 2.1.1-Action 2** Establish a program to support the reconstruction, restoration, repair, rebuilding, or preservation of historic sites.
- 2.1.1-Action 3** Incorporate the following areas of expertise into the Cultural Resources Commission:
 - (1) Generational knowledge; and
 - (2) Kupuna with traditional knowledge of land and ocean practices.
- 2.1.1-Action 4** Develop, expand, and support educational programs, festivals, celebrations, and folklore that foster the spirit of aloha.

Objective:

- 2.2** A more effective and efficient planning and review process that incorporates the best available cultural resources inventory, protection techniques, and preservation strategies.

Policies:

- 2.1.2.a** Ensure that the island has a comprehensive and up-to-date inventory of historic and archaeological resources, and their cultural significance.
- 2.1.2.b** Require the update of existing planning and regulatory mechanisms to protect the natural, cultural, scenic, and historic resources within designated Heritage Areas (see Cultural Resources Overlay/Scenic Corridor Protection Technical Reference Map).
- 2.1.2.c** Ensure that cultural, historic, and archaeological resources are protected for the benefit of present and future generations.

Implementing Actions:

- 2.1.2-Action 1** Commission cultural landscape studies of the entire island to assess areas as potential Heritage Areas.

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- 2.1.2-Action 2** Inventory potential Thematic Cultural Resource areas and submit nominations for State and/ or National Register of Historic Places.
- 2.1.2-Action 3** Prepare every ten years or whenever necessary an update to the Historic and Cultural Resources Plan and Inventory/Mapping Project that documents existing cultural and historic sites.
- 2.1.2-Action 4** Develop and adopt a Heritage Area Management Program to protect the natural, cultural, scenic, and historic resources to include:
- (1) A Heritage Area Plan with protection standards for Heritage Areas identified on the Cultural/ Scenic Resources technical reference map;
 - (2) A process to require a Cultural Landscape Report for developments within Heritage Areas; and
 - (3) Consultation with Native Hawaiian advisory bodies, when appropriate.

Objective:

- 2.3** Enhance the island’s historic, archaeological, and cultural resources.

Policies:

- 2.1.3.a** Identify and pursue a listing of the properties and sites on the State and National Register of Historic Places.
- 2.1.3.b** Support the use of easements, dedications, and other mechanisms to acquire, maintain, and protect lands with cultural, archaeological, and historic significance.
- 2.1.3.c** Support regulations to require developers, when appropriate, to prepare an Archaeological Inventory Survey, Cultural Impact Assessment, and Ethnographic Inventories that are reviewed and commented upon by the Office of Hawaiian Affairs, Native Hawaiian advisory bodies, the State Historic Preservation Division (SHPD), and the Office of Environmental Quality Control, and systematically comply with the steps listed in SHPD’s administrative rules, including consultation and monitoring during construction phases of projects.
- 2.1.3.d** Promote the rehabilitation and adaptive reuse of historic sites, buildings, and structures.
- 2.1.3.e** Encourage property owners to register historic and archaeological sites on the State and National Register.
- 2.1.3.f** Support opportunities for public involvement with the intent to facilitate the protection and restoration of historic and archeological sites, including consultation with stakeholders.
- 2.1.3.g** Encourage the resolution of land title questions relating to Land Commission Awards and Royal patents.

- 2.1.3.h** Ensure compliance with historic preservation laws, and discourage demolition of properties that are determined to be eligible for listing on the National or State Register of Historic Places.

Implementing Actions:

- 2.1.3-Action 1** Develop a comprehensive program for protection of cultural, historic and archaeological sites through the acquisition of easements, use of Transfer of Development Rights/Purchase of Development Rights, and other protective mechanisms.
- 2.1.3-Action 2** Amend regulations to provide additional protection of lands that are important for traditional native Hawaiian uses including subsistence food gathering, traditional access, agriculture, and religious uses.
- 2.1.3-Action 3** Establish additional Historic and Archaeological Districts and ensure that land use regulations are implemented to ensure their protection.
- 2.1.3-Action 4** Develop a program to identify and list Historic Places on the State and National Historic Register.



Mā'alaea Bay.

SHORELINE, REEFS, AND NEARSHORE WATERS

Maui's shoreline is a complex system of wetlands, gullies, dunes, beaches, lava fields, and hardpan substrate. Maui's coast serves as habitat for indigenous plants and animals. The health of the shoreline and beach areas is a key factor in sustaining sand resources, coral reefs, and marine wildlife. These areas serve as ecological, social, and economic resources. Various Federal, State, and County laws exist to conserve coastal resources while balancing development demands. Even with the existing regulatory framework, further management is necessary to balance rapid growth with shoreline protection.



Recreational public access point, Puamana Beach Park.

Access to shoreline and beach areas is essential for a range of recreational activities; surfing, swimming, fishing, diving, and canoeing are part of Maui's lifestyle. Many of Maui's most spectacular views are along the island's coastline. Coastal-land preservation protects cultural and historic resources, including traditional fishponds, heiau, and burial sites. A comprehensive network of State and County laws exist to preserve and enhance shoreline and coastal waters. While there are many layers of regulations, the jurisdictional boundaries and inherently complex nature of the hydrologic cycle present a challenge to effective coastal-resource protection. The Countywide Policy Plan, at page 47, establishes the following policy: "Protect and restore nearshore reef environments and water quality." The corresponding implementing action is: "Develop regulations to minimize runoff of pollutants into nearshore waters and reduce nonpoint and point source pollution."

CHALLENGES AND OPPORTUNITIES

Lack of an Integrated Coastal Zone Management Program

Maui's beaches, nearshore waters, and reef ecosystems cannot be managed or regulated independently of one another. Integrated Coastal Zone Management (ICZM) provides a more holistic approach to beach management. ICZM requires a broader effort that crosses political and geographic boundaries in an effort to achieve sustainability.

ICZM uses the informed participation and cooperation of all stakeholders to assess the societal goals in a given coastal area and to take actions towards meeting those objectives. ICZM seeks over the long term to balance environmental, economic, social, cultural, and recreational objectives, all within the limits set by natural dynamics. Integration of all relevant policy areas and levels of administration is required.

Deteriorating Reef Health and Fish Stock; Compromised Ecosystems

The Beach Management Plan for Maui (2006), prepared by the University of Hawai'i Sea Grant Extension Service, sets forth detailed objectives and recommendations to promote preservation and sustainable development of the coastline. Many of the plan's recommendations may be implemented through changes to land use policies, rules and regulations, and the establishment of new programs and partnerships.

Reef decline on Maui ranks among the fastest in the world. Several sites, both protected and developed, have seen coral communities and reliant organisms nearly disappear in approximately 20 years.¹

A majority of the human population lives and plays along the shoreline. Additional tourism and a growing resident population have increased development along the shoreline, which is a contributing factor in nearshore water quality. Coral ecosystems have not evolved to allow reef communities to recover from the types of disturbance caused by such development.²

Two stressors that can be addressed immediately are: (1) overfishing, which reduces the ability of the wider reef ecosystem to oppose replacement of coral and other reef building species by algae; and (2) deteriorating water quality caused by increased inorganic nutrients. These problems can be attributed to coastal urbanization from an ever-increasing population of residents and tourists and from the groundwater influxes of nutrients into Maui's nearshore waters.³

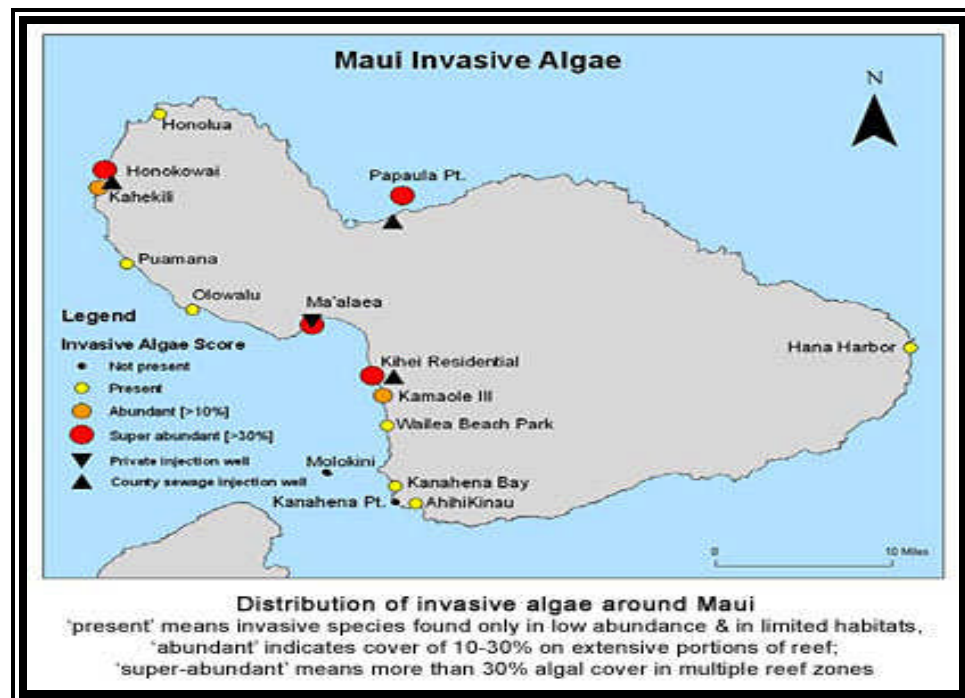


Figure 2 -1. Distribution of invasive algae.

¹ Vermeij, M.J.A. (2008). *Coral Reefs of Maui* (University of Hawai'i Press, Honolulu).

² Id.

³ Id.

Scientists have been studying the various types and locations of algal blooms. Large-scale macroalgal blooms have been documented on the island for several decades. The most common blooms are associated with the more heavily populated areas of Kīhei, Lahaina, and Kahului. The input of nitrogen and phosphorus from land-based sources such as agricultural fertilizers, sewage, and stream runoff may accelerate algal growth rates. Sewage-injection wells, defunct septic tanks, and channelized stream runoff may also contribute to the algal problem. Not only does this smother coral and destroy delicate ecosystems, but it can result in a detrimental effect on the local economy, resident lifestyles, and Native Hawaiian cultural practices. Blooms in North Kīhei have been shown to cost the County economy as a result of lost revenue and in the costs associated with removing algae from the beaches.⁴



Macroalgae smothering reef, Mā`alaea.

Once the decline starts, there is little that can be done to stop it. Prevention, rather than restoration, will be a more prudent management option.

There could be success in using small-scale kapu management programs. One consideration would be an experimental limitation on the take of herbivores (large urchins, the majority of surgeonfish, parrotfish, and chub). The Division of Aquatic Resources, of the State Department of Land and Natural Resources, is experimentally introducing such programs to limit invasive algae, restore the reefs, and replenish the fish stocks.⁵ Another implementation measure may come in the form of a “resting” period for certain reefs where tour-boat mooring and snorkeling is popular. There may also be noticeable success in increasing the number of Marine Managed Areas (MMA) on Maui. For instance, the Honolua-Mokule`ia Bay Marine Life Conservation District has been protected since 1978, and recent surveys have shown success in the form of higher fish biomass, more large-sized fishes, and a greater number of species.⁶

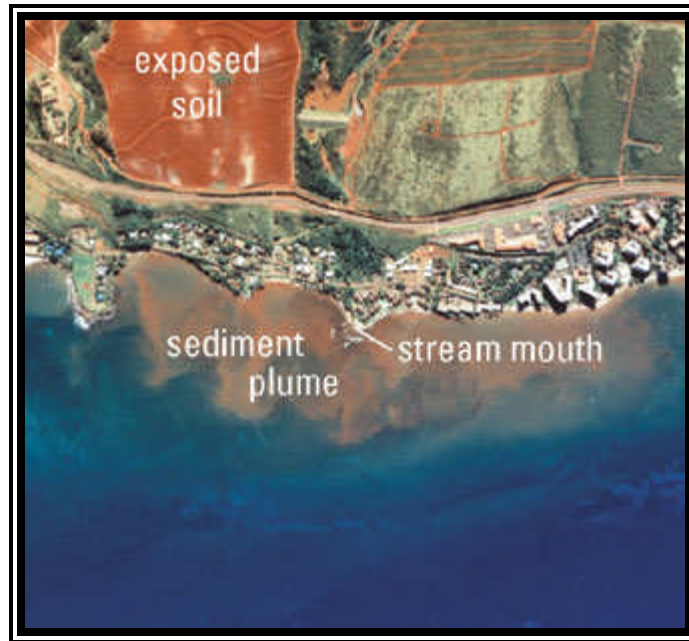
⁴ Vermeij, M.J.A. (2008). *Coral Reefs of Maui* (University of Hawai`i Press, Honolulu).

⁵ State of Hawai`i Division of Aquatic Resources, Department of Land and Natural Resources (2007). *Slippery Slope to Slime*.

Poor Water Quality Because of Upland Activities

MMAAs can be accomplished in a variety of ways with different definitions of what is allowable. Each coastal community should be managed and protected with respect to its specific needs.

Nonpoint source (NPS) pollution is a major threat to Maui's nearshore coastal ecosystems. Urban development, agriculture, and degraded watersheds are significant contributors to such pollution. Urban development changes the natural hydrology of an area through site clearing, grading, impervious surfaces, and unnatural landscapes. Such activities decrease the ability of water to infiltrate the soil surface, which increases runoff volumes. Increased runoff produces erosion, which in association with urban activities, results in the discharge of sediment and pollutant loadings to surface and coastal waters.



Agricultural runoff, West Maui.

Agricultural activities also generate a tremendous amount of NPS pollution. Active agriculture requires regular disturbances to the land and the use of fertilizers and pesticides to cultivate crops. Likewise, golf courses and landscape planting, especially along the developed shoreline, generate NPS pollution from the application of fertilizers and pesticides.

The State of Hawai'i's Coastal Nonpoint Pollution Control Program Management Plan (1996) and Implementation Plan for Polluted Runoff Control (2000) (cumulatively, the Nonpoint Pollution Plans) provide a comprehensive statewide strategy to prevent and reduce polluted runoff in agriculture, forestry, urbanization, marinas, recreational boating, hydromodifications, and wetland and riparian areas.

⁶ Vermeij, M.J.A. (2008). *Coral Reefs of Maui* (University of Hawai'i Press, Honolulu).

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The goal of the Nonpoint Pollution Plans is to protect coastal waters from polluted runoff. The County of Maui will be a key partner and advocate with the State in effectuating these plans.

The Nonpoint Pollution Plans recommend the required reduction of post-development loadings of pollutants known as total suspended solids (TSS) to levels similar to predevelopment levels. This can be achieved through the incorporation of various structural and non-structural enhancements. Reduction of TSS to predevelopment levels should be required of all new subdivisions to protect nearshore water quality.



Sandbags and seawalls, West Maui.

The County's grading ordinance (Chapter 20.08, MCC) generally requires an erosion control plan, specifying best management practices (BMP), when a parcel exceeding one acre (43,560 square feet) is proposed for grading. The Nonpoint Pollution Plans recommend that an erosion control plan be required when the area of grading exceeds 5,000 square feet. Establishing such a requirement could significantly reduce the impact of grading activities on coastal water quality. In addition, monitoring of an erosion control plan and the imposition of stiff penalties for non-compliance are necessary to ensure that BMPs are properly implemented.

As humans have constructed their houses on the shoreline, they have had to adapt to natural environmental processes that may alter or damage their structures. Alterations to the shoreline, such as hardening and excessive extraction of sand from nearby dunes, can pose a threat to those very beaches and dunes. When natural sand-transport processes are interrupted through human actions, such as the construction of seawalls and revetments, it can deprive adjacent beaches of the sand necessary to compensate for erosion arising from storm surge, sea-level rise, and wave action.

Coastal erosion is a natural process, whereby the width of the beach is maintained by sand resources held in dunes, but coastal land is lost. In contrast, beach erosion is the loss of beach width arising from erosion and the impoundment of sand behind seawalls. While shoreline hardening is appropriate in some circumstances, the loss of Maui's beaches is often accelerated when private landowners attempt to protect their oceanfront property by armoring the shoreline.



Decreased sand and beach, Kā'anapali.

The Hawai'i Coastal Hazard Mitigation Guidebook (2005) serves as a precautionary tool for coastal development and planning throughout the State. Recognizing that policies for coastal-hazard assessment and shoreline setbacks are not uniform, the guidebook fills in critical gaps related to hazard zones, erosion trends, storm events, and safety-buffer design. The guidebook recommends erosion-rate shoreline setbacks based on the size, type, and lifespan of structures. In contrast to Maui's use of a 50-year multiplier for construction setbacks based on annual erosion rates, the guidebook recommends multipliers of 70 and 100 years, dependent on structure specifics.

Maui's pristine beaches and clear, clean waters are key elements in tourism and the public's recreational opportunities. Therefore, the regulation of shoreline development, including severe restrictions on shoreline hardening, is of critical economic, environmental, and social importance.



A surfer at Puamana Beach Park, Lahaina.

Limited Public Beach Access and Facilities

With Maui's growing population of visitors and residents, there is an increasing demand to develop along the shoreline. Many privately owned, undeveloped shoreline parcels that have traditionally been utilized by the public for recreational purposes and cultural practices are now being developed. Development of these parcels restricts the public's opportunity to utilize these coastal lands.

The MIP provides numerous policy recommendations for implementing more effective beach management practices.

SUMMARY OF SHORELINE, REEFS, AND NEARSHORE WATERS ISSUES

Maui's comprehensive coastal zone management and regulatory framework is designed to protect the shoreline and abutting waters. However, human activities contributing to NPS pollution, shoreline hardening, increased development, and lack of beach access are among the major threats to the integrity and the public's use of the island's beaches and coastal waters. With the dynamic nature of Maui's coastal areas, the County will continue to face challenges in its resource management programs. A few shoreline protection issues include:

- Lack of an ICZM program
- Deteriorating reef health and fish stocks and compromised marine ecosystems
- Poor water quality arising from upland activities
- Limited public beach access and facilities

GOAL, OBJECTIVES, POLICIES, AND ACTIONS

Goal:

- 2.2** An intact, ecologically functional system of reef, shoreline, and nearshore waters that are protected in perpetuity.

Objective:

- 2.2.1** A more comprehensive and community-based ICZM program.

Policies:

- 2.2.1.a** Encourage a management system that protects and temporarily rests the reef ecosystems from overuse.
- 2.2.1.b** Support the establishment of additional MMAs and reef replenishment areas.
- 2.2.1.c** Work with appropriate agencies and community members to protect any special managed conservation areas from overuse and ensure that surrounding land uses do not contribute to the degradation of the natural resources, such as `Ahihi-Kina`u Natural Area Reserve, Honolua-Mokulē`ia Bay Marine Life Conservation District, and Mākena State Park.
- 2.2.1.d** Incorporate the following into the MIP, where consistent with the MIP:
(1) Beach Management Plan for Maui;

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- (2) Coastal Nonpoint Pollution Control Program Management Plan;
- (3) Implementation Plan for Polluted Runoff Control; and
- (4) Ocean Resource Management Plan.

2.2.1.e Support greater coordination among governmental agencies involved with the protection of the island's marine resources.

Implementing Actions:

2.2.1-Action 1 Seek funding and work with other agencies and organizations to establish and prioritize MMAs around Maui's coastline.

2.2.1-Action 2 Establish an advisory committee to advocate the conservation and management of coastal resources, including members with generational knowledge; kupuna with traditional and/or area knowledge; and those possessing traditional knowledge of land or ocean practices.

Objective:

2.2.2 Improved reef health, coastal water quality, and marine life.

Policies:

2.2.2.a Create additional mechanisms where needed to contain and control runoff and pollution.

2.2.2.b Allow extraction of high quality, Class A, low silt sands only when they will be used to protect or restore Maui's shorelines and beaches.

2.2.2.c Carefully manage beach nourishment activities to protect the coastal and marine ecosystem.

2.2.2.d Require, where appropriate, a buffer between landscaped areas and the shoreline, gulches, and streams to reduce the runoff of fertilizers, pesticides, herbicides, and other pollutants into coastal waters.

2.2.2.e Strictly regulate shoreline armoring in accordance with adopted Shoreline Rules, with an intent to protect the coastal and marine ecosystem.

2.2.2.f Support greater protection of Keālia Pond National Wildlife Refuge through the following:

- (1) Enhancement of marine ecosystems;
- (2) Beach and sand dune restoration; and
- (3) Expansion of habitat for Maui's threatened or endangered sea turtles, birds, and other species.

2.2.2.g Support the development of regulations to prevent the excessive depletion of fish stocks due to non-sustainable practices and gear such as SCUBA spear-fishing and lay nets, within the context of nearshore ecosystems.

HERITAGE RESOURCES

- 2.2.2.h** Encourage the State to conduct a regular census of fish populations and monitor coral health.
- 2.2.2.i** Encourage the State to significantly increase the number of park rangers, enforcement officers, and marine biologists to protect coastal resources.
- 2.2.2.j** Encourage the State to prohibit the collection and exportation of fish, coral, algae, and other marine species for the ornamental and aquarium trade.

Implementing Actions:

- 2.2.2-Action 1** Adopt coastal landscaping provisions that include standards such as setbacks, buffers, and other measures that promote the use of native plants and xeriscaping.
- 2.2.2-Action 2** Develop a master plan and feasibility study for the preservation and enhancement of the Ma`alaea Beach recreation area and Keālia Pond National Wildlife Refuge to include the possible mauka realignment of North Kīhei Road.
- 2.2.2-Action 3** Work with appropriate agencies, landowners, and community groups to identify Maui's Hawaiian fishponds and develop a management plan for their protection, repair, restoration, and use.
- 2.2.2-Action 4** Implement a Reef Protection Restoration Plan.

Objective:

- 2.2.3** Water quality that meets or exceeds State Clean Water Act standards.

Policies:

- 2.2.3.a** Reduce the amount of impervious surface and devise site plan standards that aim to minimize storm runoff and NPS pollution.
- 2.2.3.b** Support the revision of existing regulations to require an Erosion and Sedimentation Control Plan (ESCP) for development activities that may pose a threat to water quality.
- 2.2.3.c** Require an on-site monitoring program, where applicable, when grading may pose a threat to water quality or when recommended in the ESCP.
- 2.2.3.d** Avoid development actions that impair Maui's reef systems and remove identified stressors.
- 2.2.3.e** Phase out cesspools and restrict the use of septic systems in ecologically sensitive coastal areas by converting to environmentally-friendly alternative sewage treatment systems, and connecting to central sewerage systems when and where feasible.
- 2.2.3.f** Prohibit the development of new wastewater injection wells, except when unavoidable for public health and safety purposes.

HERITAGE RESOURCES

- 2.2.3.g** Ensure that the County upholds its affirmative duty under the Clean Water Act by monitoring and reducing point and NPS pollution to help safeguard coastal waters.

Implementing Actions:

- 2.2.3-Action 1** Transition from the use of wastewater injection wells to appropriate, environmentally sound methods of wastewater disposal, and promote the beneficial reuse of wastewater effluent.

- 2.2.3-Action 2** Revise regulations:

- (1) Require the approval of an ESCP for development activities that may pose a threat to water quality.
- (2) Require an on-site monitoring program, where applicable, when grading may pose a threat to water quality or when recommended in the ESCP.
- (3) Devise site plan standards using innovative tools.
- (4) Control the pollutant load by imposing standards that are more restrictive than the State water quality control standards.

Objective:

- 2.2.4** Acquire additional shoreline lands and shoreline access rights.

Policies:

- 2.2.4.a** Promote the use of conservation easements, land trusts, transfer and purchase of development rights, and mitigation banking.

- 2.2.4.b** Require the dedication of public beach and rocky shoreline access ways to and along the shoreline where it serves a practical public interest as a condition of development or subdivision approval; future subdivisions and developments shall be consistent with and effectuate, to the extent practicable, the *Shoreline Access Inventory Update - Final Report* (March 2005), and its updates.

- 2.2.4.c** Incorporate the *Shoreline Access Inventory Update - Final Report* (March 2005), and its regular updates, into this plan.

- 2.2.4.d** Identify access points while further acquiring key shoreline parcels and easement rights to enhance and protect beach access and shoreline recreation.

Implementing Actions:

- 2.2.4-Action 1** Revise subdivision and development regulations to:

- (1) Increase linear frequency for public access to and along the shoreline; and
- (2) Require access to and along the shoreline as a condition of subdivision, land use entitlement, and/or discretionary development approval.

- 2.2.4-Action 2** Prioritize the acquisition of shoreline parcels in accordance with the recommendations of the *Shoreline Access Inventory Update – Final Report* (March 2005), and other plans funded by the Coastal Zone Management Program.

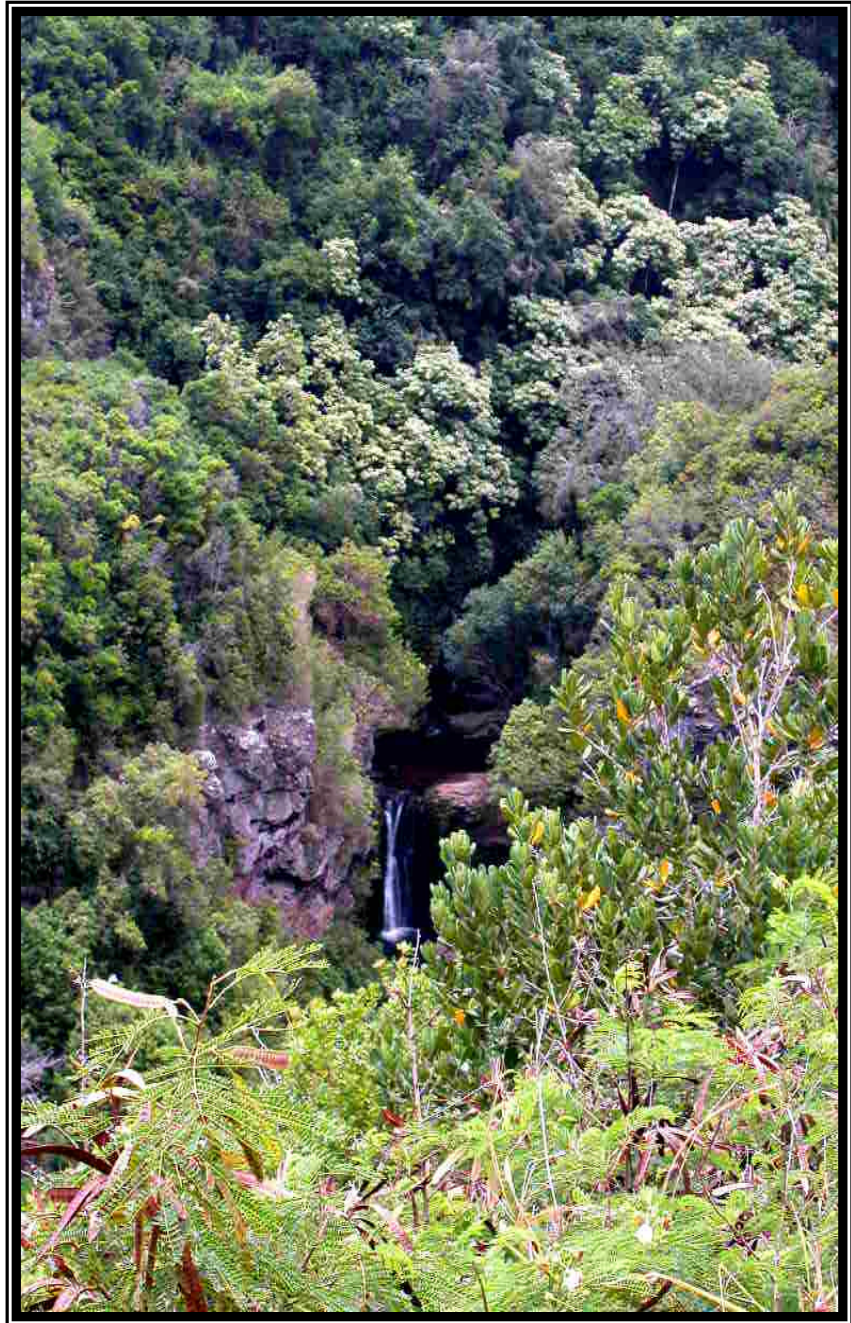
HERITAGE RESOURCES

- 2.2.4-Action 3** Implement the Pali to Puamana Plan to facilitate the restoration of shoreline and coastal resources along the eight-mile stretch of seashore from Ukumehame to Puamana.
- 2.2.4-Action 4** Acquire development rights for the lands adjoining Ho`okipa Beach Park, to enhance coastal zone management.
- 2.2.4-Action 5** Acquire coastal lands between the Central Maui Wastewater Reclamation Facility and Pā`ia Town in accordance with the recommendations of the Northshore Greenway Master Plan.
- 2.2.4-Action 6** Develop and adopt funding mechanisms to finance the acquisition of additional shoreline lands in South and West Maui, and other areas as they urbanize.

WATERSHEDS, STREAMS, AND WETLANDS

Traditional Hawaiian management models recognized the key importance of fresh water and the opportunities to manage water resources in a basin-wide context called the ahupua`a.

Beginning at the top of the mountains, the ahupua`a follows the ridgeline, down enclosing valleys and their resources, and extends out to the nearshore coral reefs and sea. This is what we typically refer to as a watershed. Within the ahupua`a, traditional conservation and



One of the many waterfalls in East Maui.

management practices were based on indigenous knowledge, with a respect for the land and water.

Maui's Critical Watersheds and Streams

Maui consists of two large-scale watersheds: West Maui and East Maui. One portion of the East Maui watershed is one of the wettest areas in the State, receiving up to 400 inches of rainfall per year. Maui's watersheds are a mix of streams, gulches, aquifers, and rivers varying in size, flow, and connectivity. Maui's watersheds and corresponding major streams are outlined in Table 2-2.

Table 2 – 2: Maui's Major Streams	
East Maui Watershed	West Maui Watershed
<ul style="list-style-type: none"> • Waikamoi Stream • Kailua Stream • Hanawī Stream • `Ohe`o Gulch • Makapipi Stream • Palikea Stream 	<ul style="list-style-type: none"> • `Īao Stream • Waiehu Stream • Waihe`e River • Waikapū Stream • Honokōhau Stream

CHALLENGES AND OPPORTUNITIES

Integrated Watershed Management

Maui's nearshore waters and marine life are dependent on functioning watersheds. Without healthy watersheds as a buffer, soil and sediment can erode and flow into nearshore reefs and ocean waters, smothering coral reef colonies. Such runoff can also cause the temperature of the water column to rise, in turn degrading the habitat and marine-life spawning areas.

The East Maui Watershed Partnership, West Maui Mountains Watershed Partnership, and the Leeward Haleakalā Watershed Restoration Partnership are existing watershed-based partnerships that coordinate the efforts of various government agencies, private businesses, and conservation organizations. These partnerships develop long-term resource inventories and management plans for their respective watersheds. The County of Maui, as a member of these partnerships, should continue to support their efforts and utilize the valuable inventories and plans they develop.

Point and NPS Pollution

Polluted runoff from urban and agricultural activities, commonly referred to as NPS pollution, degrades water quality. Such pollution and erosion impacts plants, animals, and human users of a watershed from upper elevations down to coastal lands and nearshore waters.

To mitigate NPS pollution from agricultural operations, the County should actively partner with the State to implement the Department of Health's Pollution Prevention Plan, which provides incentives to farmers who prepare plans to address such issues as erosion control, nutrient and pesticide management, runoff from confined animal facilities, grazing management, and irrigation.

Aquatic habitats ecologically link together most of the terrestrial habitats. The flow of water from mountaintops transports nutrients, organic matter (energy), and water down through the various forested habitats into estuaries and wetlands at low elevations and then finally into the sea. This organic energy from dead plants and animals fertilizes the growth of plants and animals in lower-elevation habitats; the streams and groundwater flow provide water for plants and animals throughout the ecosystem. Many native freshwater aquatic animals migrate between the ocean, estuaries, and upper reaches of streams as part of their life cycle, as noted in Hawai'i's Comprehensive Wildlife Conservation Strategy (2005) (Wildlife Study).⁷



Ginger-dominated forest, Waikamoi Preserve.

Loss of Riparian Biodiversity

Land conversion of Upcountry forested lots for residential uses removes trees and vegetation, which increases erosion and stormwater runoff. Mature trees are often removed to enhance vistas from a parcel and to make grading and utility installation easier. Yet, when trees are removed, erosion is increased, and sediment and stones flow into headland streams. The reduction or increase of vegetation at higher elevations can significantly impact the amount of available fresh groundwater. When fog is able to condense on trees and other vegetation, it can increase total annual precipitation by as much as 30 percent.⁸

Invasive species threaten the health of Maui's watersheds. Non-native species may out-compete native species or may directly harm native species through predation or infection. *Miconia*, a fast-growing, weedy tree from South and Central America, has caused serious damage on Maui by destabilizing watersheds and inducing landslides.

⁷ Department of Land and Natural Resources (2005). *Hawai'i's Comprehensive Wildlife Conservation Strategy*.

⁸ Meher-Homji, V.M. (1991). *Climatic Change; Probable Impact of Deforestation on Hydrological Processes* (Stanford University, Palo Alto).

Inappropriate Development

Feral ungulates, or wild hooved animals, such as boars, goats, axis deer, and mouflon, can drastically alter watersheds by eating understory plants down to their roots, leaving barren land susceptible to erosion.

Maui's watersheds are threatened by unregulated land conversion. These key threats are negatively impacting the health of the island's watersheds. The incidence of increased population and subsequent demand for residential land will prompt the need for long-range planning and vigilant management to ensure the health of watersheds and streams for future generations.

The implementation of an island-wide directed-growth strategy that channels growth to areas suitable for urban development provides one mechanism to protect the natural integrity of Maui's critical watersheds. Overall, development within Maui's critical watersheds will be discouraged. When development or subdivision of land does occur on agricultural lands or within the State Conservation District, the County or State should require documentation that development of areas susceptible to high erosion and sediment loss will be avoided.

To further protect the resource, conservation subdivision design (CSD) plans and the incorporation of low-impact development (LID) techniques should be considered. This could be accomplished through the establishment of an overlay district applied to Maui's critical watershed areas. CSD plans and LID techniques include the following: clustering development; utilizing innovative stormwater- and wastewater-management techniques such as rain gardens, vegetated swales, and neighborhood-scale wastewater-disposal systems; avoiding sensitive environmental features; buffering streams from development; limiting impervious surfaces; reducing driveway and roadway widths; and minimizing lawn coverage and tree removal.



East Maui Irrigation Company ditch next to Hāna Highway.

Diversion and Damming

A stream's natural flow can be altered through diversion and damming, affecting the overall watershed by compromising the vitality of its flora and fauna. Many of Maui's streams are diverted for agricultural irrigation and domestic use. According to the Wildlife Study, Maui has the highest number of diverted streams in the State. Diversion results in reduced stream flow and a rise in water temperature, thus negatively affecting many aquatic species.

With the high number of diverted streams on Maui, it is necessary to take proactive steps to protect endemic aquatic species and their spawning grounds. The County should work with State agencies to "protect baseline stream flows for perennial streams, and support policies that ensure adequate stream flow to support Native Hawaiian aquatic species, traditional kalo cultivation, and self-sustaining ahupua`a", consistent with the policy established at page 46 of the Countywide Policy Plan.

SUMMARY OF WATERSHEDS, STREAMS, AND WETLANDS ISSUES

Many of Maui's streams and watersheds are privately controlled, while water resources are held in public trust for the people. Some of the major watershed, stream, and wetland issues facing Maui include:

- Absence of a comprehensive and integrated approach to watershed management
- Watershed pollution from point and nonpoint sources
- Loss of riparian biodiversity
- Inappropriate development near and around sensitive habitats that support native, endangered, and endemic species habitat
- Stream diversion, damming, and alteration resulting in a disruption of the hydrologic cycle

GOAL, OBJECTIVES, POLICIES, AND ACTIONS

Goal:

2.3 Healthy watersheds, streams, and riparian environments.

Objective:

2.3.1 Greater protection and enhancement of watersheds, streams, and riparian environments.

Policies:

2.3.1.a All present and future watershed management plans shall incorporate concepts of ahupua`a management based on the interconnectedness of upland and coastal ecosystems/species.

2.3.1.b Continue to support and be an active member of watershed partnerships.

2.3.1.c Support the establishment of regional water trusts, composed of public and private members, to manage water resources.

2.3.1.d Support regulations to require developments to utilize ahupua`a management practices.

- 2.3.1.e** Work with private and non-profit entities to educate the public about the connection between upland activities within the watershed and the impacts on nearshore ecosystems and coral reefs.
- 2.3.1.f** Provide adequate funding and staff to develop and implement watershed protection plans and policies, including acquisition and management of watershed resources and land.
- 2.3.1.g** Encourage the State to mandate instream assessment to provide adequate water for native species.
- 2.3.1.h** Maui will protect all watersheds and streams in a manner that guarantees a healthy, sustainable riparian environment.

Implementing Actions:

- 2.3.1-Action 1** Develop, regularly update, and adopt watershed management plans for regions of the island not covered by existing plans.
- 2.3.1-Action 2** Work with the State and Federal government to ensure instream assessment to assure the reproductive system/cycle for Native species and for other purposes.

Objective:

- 2.3.2** Decreased NPS and point source pollution.

Policies:

- 2.3.2.a** Enforce water pollution related standards and codes.
- 2.3.2.b** Support the use of LID Techniques such as those described in the State of Hawai'i LID Practitioner's Guide (June 2006), as amended.
- 2.3.2.c** Encourage farmers and ranchers to use agricultural BMPs to address NPS pollution.

Implementing Actions:

- 2.3.2-Action 1** Adopt standards to reduce the amount of nutrients that enter watersheds, and encourage the reduction of landscape fertilizers and pesticides.
- 2.3.2-Action 2** Develop updated grading BMPs that are appropriate for Maui.
- 2.3.2-Action 3** Implement the Pollution Prevention Plan (PPP) program, which provides incentives for agricultural operations to prevent runoff and nonpoint source pollution.

Objective:

- 2.3.3** Preserve existing wetlands and improve and restore degraded wetlands.

Policies:

- 2.3.3.a** Prohibit the destruction and degradation of existing upland, mid-elevation, and coastal wetlands.
- 2.3.3.b** Support and fund wetland protection and improvement, and restoration of degraded wetlands.
- 2.3.3.c** Where applicable, require developers to provide a wetland protection buffer and/or other protective measures around and between development and wetland resources.

Implementing Actions:

- 2.3.3-Action 1** Develop standards for appropriate buffers and/or other protective measures for development near or around wetlands.
- 2.3.3-Action 2** Enact ordinances to ensure no net loss of wetlands.
- 2.3.3-Action 3** Enforce no net loss of wetlands and improve degraded wetlands.
- 2.3.3-Action 4** Assist in the preservation and enhancement of Keālia and Kanahā-Mauoni Ponds; Lāʻie, Kalepolepo, Nuʻu, Ukumehame, Olowalu, Launiupoko, and Mākena wetlands; and other wetland areas.

Objective:

- 2.3.4** Greater preservation of native flora and fauna biodiversity to protect native species.

Policies:

- 2.3.4.a** Work with appropriate agencies to eliminate feral ungulate populations and invasive species.
- 2.3.4.b** Encourage the State to provide adequate funding to preserve biodiversity, protect native species, and contain or eliminate invasive species.
- 2.3.4.c** Support the work of conservation groups and organizations that protect, reestablish, manage, and nurture sensitive ecological areas and threatened indigenous ecosystems.

Implementing Actions:

- 2.3.4-Action 1** Develop tree protection regulations that restrict the removal of vegetation outside of identified building envelopes/protected areas.
- 2.3.4-Action 2** Develop strategic partnerships with conservation groups and organizations to maximize Federal, State, County, and private funding; and increase cooperation to achieve conservation goals.

Objective:

- 2.3.5** Limited development in critical watershed areas.

Policies:

- 2.3.5.a** Discourage development and subdivision of land within critical watersheds and in areas susceptible to high erosion and sediment loss.
- 2.3.5.b** Designate critical watershed areas as conservation lands.
- 2.3.5.c** Strongly encourage new subdivisions and developments that are proximate to environmentally sensitive watershed resources to prepare and implement CSD plans.

Implementing Actions:

- 2.3.5-Action 1** Develop tools, such as CSD plans, to protect watershed resources and sensitive habitats.
- 2.3.5-Action 2** Identify and map critical watersheds, sensitive habitats, and those areas susceptible to high erosion and sediment loss.

Objective:

- 2.3.6** Enhance the vitality and functioning of streams, while balancing the multiple needs of the community.

Policies:

- 2.3.6.a** Protect and enhance natural streambeds and discourage stream alteration.
- 2.3.6.b** Work with appropriate agencies to establish minimum stream flow levels and ensure adequate stream flow to sustain riparian ecosystems, traditional kalo cultivation, and self-sustaining ahupua`a.
- 2.3.6.c** Respect and participate in the resolution of native Hawaiian residual land and water rights issues (kuleana lands, ceded lands, and historic agricultural and gathering rights).
- 2.3.6.d** Ensure that stream flows implement laws and policies found in the State Constitution and Water Code.
- 2.3.6.e** Work with appropriate agencies and stakeholders to establish minimum stream flow levels, promote actions to support riparian habitat and the use of available lo`i, and maintain adequate flows for the production of healthy kalo crops.

Implementing Actions:

- 2.3.6-Action 1** Compile and update data on the needs of the multiple users of water.

WILDLIFE AND NATURAL AREAS

Many of Maui's natural areas and wildlife are in designated State and National Parks, nature preserves, forest reserves, natural area reserves, and private lands. These lands contribute to the quality of life on Maui, attract visitors, provide



habitat for native species, and are inextricably tied to the Hawaiian culture.

Maui's natural areas and wildlife are key components of the island's identity. As the island experiences an increase in population and subsequent demand for development, Maui's natural areas and wildlife will experience increased challenges, requiring strong management and protection.

Waterfall in Kīpahulu.



‘Ōhi‘a forest, Waikamoi Preserve.

CHALLENGES AND OPPORTUNITIES

Lack of Integrated Environmental Resource Planning and Management

Maui’s natural areas and undeveloped open space provide wildlife plant and animal habitat for many of Hawai‘i’s native and endangered species. Furthermore, these areas are resources for the island’s residents and visitors. Many wildlife and natural areas contain rainforests and dryland forests and other disappearing Hawaiian ecosystems that are critical for the survival of many native species.

Native wildlife is important to residents. According to the Wildlife Values in the West (2005) survey, a large majority of Hawai‘i’s residents (71.4 percent) strongly agree that it is important to take steps to prevent the extinction of endangered species. Wildlife-viewing opportunities are worth hundreds of millions of dollars to the State’s tourism industry, according to the United States Department of Interior.

The Countywide Policy Plan, at page 46, establishes the following policies:

“Preserve and reestablish indigenous and endemic species’ habitats and their connectivity.”

“Expand coordination with the State and nonprofit agencies and their volunteers to reduce invasive species, replant indigenous species, and identify critical habitat.”

A strong foundation of programs and partnerships to protect endangered species is in place. The State and Federal government have the primary responsibility for managing endangered species; however, the County should continue to play a key supportive role through its land use planning and regulatory responsibilities.

Loss of Natural Areas and Wildlife Habitat

With Maui's continually growing population, previously undeveloped areas are experiencing increased development pressure, particularly in the State Agricultural District. Many agriculturally designated lands are home to threatened and endangered species that could be harmed by development. The County can ensure greater protection of flora and fauna resources by requiring assessments for development in areas with medium, high, and very high concentrations of threatened and endangered species.



Cyanea mceldowneyi, endemic to East Maui.

The Natural Area Partnership Program (NAPP) was created within the Division of Forestry and Wildlife, State Department of Land and Natural Resources, to protect privately owned lands with intact Native Hawaiian ecosystems and essential habitat for endangered species. The program provides private landowners with assistance to protect land in perpetuity through transfer of fee title or a conservation easement to the State or a cooperating entity.

Programs such as NAPP are vital to the preservation of natural areas; however, they rely on private landowners to voluntarily initiate the partnership. An inventory and evaluation of NAPP-eligible lands could be conducted to identify lands that add to contiguous native ecosystems and provide vital habitat for native species. For lands identified as possessing these characteristics, proactive steps could be taken to encourage property owners to protect the land.

To fund the acquisition of important natural areas, the County may apply for grants from the Land Conservation Fund, pursuant to Section 173A-5, Hawai'i Revised Statutes, to obtain funding for the acquisition of land and easements for watershed protection, parks, coastal areas, scenic resources, and other natural areas.



Greensword found only in the West Maui Mountains.

Maui is biologically diverse and characterized by high levels of endemism (species unique to the island) in animals and plants, with more than 10,000 species found nowhere else on Earth. Rates of endemism are typically 99 percent to 100 percent for terrestrial insects, spiders, and land snails; 90 percent for plants; more than 80 percent for breeding birds; and 15 percent to 20 percent for aquatic

fauna.⁹

The longevity of a species is directly related to the health of its habitat. In addition to the individual species, the native habitats can be considered endangered because of habitat fragmentation. Vast expanses of Maui's native habitats have already been lost; therefore, preservation of remaining habitat is vital to the survival of many species.

Historically, activities such as logging, agriculture, grazing, military use, fire, and urban, rural, and residential development have claimed more than half of Hawai'i's native habitats. At low elevations, where development pressures are highest, less than 10 percent of native vegetation remains, according to the Wildlife Study.¹⁰ Native flora is in need of conservation; more than 250 species are federally listed as threatened or endangered.



`Ama`u fern.

⁹ Department of Land and Natural Resources (2005). *Hawai'i's Comprehensive Wildlife Strategy*.

¹⁰ Id



Horizon across from Keālia Pond.

The upper elevations of West Maui and Haleakalā provide vital habitat for endangered and endemic plants and animals. With the threat of habitat destruction and invasive species in the lower elevations of the island, many native species have been forced to adapt to higher elevation. East Maui, in particular, has been identified as containing some of the last remaining intact Native Hawaiian ecosystems in the State. The Waikamoi Preserve, within East Maui, protects hundreds of native species. The koa-`ōhi`a forest within the preserve provides a sanctuary for many endangered plants and animals. State and Federal lands, such as State Forest Reserves and Haleakalā National Park, also provide habitat for many endangered species and protect sensitive habitat.

Kanahā Pond Wildlife Sanctuary in Kahului provides vital habitat for native waterbirds. Keālia Pond National Wildlife Refuge, on Maui's south shore, provides critical habitat for many endangered bird species. The refuge protects some of the last remaining native wetland habitat in the State.

Hawai`i presents both an opportunity and challenge for conservation. While the threats to Hawai`i's native species persist, recent years have seen greater awareness of the need to take action to conserve biodiversity, more assertive political will to take steps to address the problems, and wider community involvement in projects.¹¹

Maui's native species and their habitats are also important cultural resources for Native Hawaiians. Historically, feathers from forest birds were used to make elaborate capes, lei, and helmets for the ali`i. In present-day Hawai`i, the link between Native Hawaiian culture and native species has not been lost, as seen in the continuation of traditional practices such as gathering of native plants for hula, medicinal uses, carving, weaving, and ceremonies.

The greatest threat to native and endemic species of Hawai`i is invasive species. Because of their evolutionary history, Hawai`i's native plants and animals are particularly susceptible to the threats posed by the introduction and spread of invasive species and pathogens. The introduction of invasive species causes environmental and economic harm. Non-native species may out-compete native species or may directly

Introduction of Invasive Species

¹¹ Department of Land and Natural Resources (2005). *Hawai`i's Comprehensive Wildlife Strategy*.

harm native species through predation or infection. Non-native species may also threaten native species through interbreeding and hybridization, leading to the loss of the native species as a unique species. The Wildlife Study estimated that more than 6,000 introduced terrestrial and aquatic species were established and that approximately 26 percent to 30 percent of species in Hawaiʻi are non-native.¹² While many introductions do not pose a threat to native habitats, approximately 10 percent of the established non-native species are highly invasive or pose significant threats to Hawaiʻi's ecosystems.

No other state has experienced a similar invasion of non-native competitors, predators, habitat-modifiers, vectors of infectious disease, and pathogens, according to the Wildlife Study.¹³ Over a nine-month period, the State Department of Agriculture discovered more than 100 alien species entering the island via air cargo, as reported in the Kahului Airport Pest Risk Assessment (2002).

Feral ungulates pose a major threat to native plants by consuming and trampling native understory plants. In turn, this has created conditions favoring non-native plant infestation and establishment, preventing the establishment of ground-rooting native plants, and disrupting soil-nutrient cycling.

Actions that will assist conservation efforts include the protection of existing native habitats from feral animals, invasive plant control and eradication, monitoring of populations, and additional research on methods to address the role of invertebrates and disease. Furthermore, education and outreach efforts will teach residents and visitors about invasive species, how to avoid introduction, and how to eradicate those that are already a nuisance.

SUMMARY OF WILDLIFE AND NATURAL AREAS ISSUES

Maui's wildlife and natural area resources are key components of the island's identity. Interconnected natural landscapes that provide habitat for native and endangered species can be affected and degraded by a few activities that reduce their habitat value. Major issues affecting Maui's wildlife and natural areas include:

- Lack of integrated environmental resource planning and management
- Loss of natural areas and wildlife habitat
- Introduction of invasive species

GOAL, OBJECTIVES, POLICIES, AND ACTIONS

Goal:

2.4 Maui's natural areas and indigenous flora and fauna will be protected.

¹² Department of Land and Natural Resources (2005). *Hawaiʻi's Comprehensive Wildlife Strategy*.

¹³ Id.

HERITAGE RESOURCES

Objective:

- 2.4.1** A comprehensive management strategy that includes further identification, protection, and restoration of indigenous wildlife habitats.

Policies:

- 2.4.1.a** Identify and inventory the following:
- (1) Natural, recreational, and open space resources;
 - (2) Flora and fauna with medium, high, and very high concentrations of threatened or endangered species; and
 - (3) Location and extent of invasive species.
- 2.4.1.b** Require flora and fauna assessment and protection plans for development in areas with concentrations of indigenous flora and fauna; development shall comply with the assessment and protection plan and shall use the avoidance, minimization, and mitigation approach respectively, with an emphasis on avoidance.
- 2.4.1.c** Support the implementation of Hawai'i's Comprehensive Wildlife Conservation Strategy (October 2005).

Implementing Actions:

- 2.4.1-Action 1** Develop, and regularly update, an island-wide Environmental Resources Sites' database to serve as a basis for decision making to include the following: natural preserves; watersheds; wetlands; streams; dryland forests; critical habitat areas; natural barrier resources; and other sensitive landforms and features on an Environmental Resources Map.
- 2.4.1-Action 2** Prepare the following, in coordination with the State and resource partnerships:
- (1) An inventory of key habitats that lack regulatory protections; and
 - (2) An inventory of NAPP-eligible lands.
- 2.4.1-Action 3** Increase wildlife and natural area planning expertise throughout the County government.
- 2.4.1-Action 4** Amend existing regulations to require flora and fauna assessments and protection plans for development in areas with identified concentrations of indigenous flora and fauna.

Objective:

- 2.4.2** A decrease in invasive species through programs and partnerships that eradicate undesirable species and protect native habitat.

Policies:

- 2.4.2.a** Prevent the introduction of invasive species at all of Maui's airports and harbors.
- 2.4.2.b** Encourage the State to increase funding in support of invasive species interception, control, and eradication.

HERITAGE RESOURCES

- 2.4.2.c** Encourage the State to develop programs that allow students to participate in invasive species eradication projects.

Implementing Actions:

- 2.4.2-Action 1** Work with Federal and State agencies to develop and implement procedures for the inspection of incoming cargo, passenger baggage, and vehicles for invasive species and prohibited plants and animals.
- 2.4.2-Action 2** Pursue Federal and other dedicated funding for invasive species intervention at harbors and airports.
- 2.4.2-Action 3** Pursue Federal and other funding for public/private partnerships to develop and implement environmental protection programs.

Objective:

- 2.4.3** Greater protection of sensitive lands, indigenous habitat, and native flora and fauna.

Policies:

- 2.4.3.a** Secure an interconnected network of sensitive lands, greenways, watercourses, and habitats.
- 2.4.3.b** Protect Maui's sensitive lands (see Sensitive Lands on Protected Areas Diagrams).
- 2.4.3.c** Promote innovative environmental-planning methods and site-planning standards that preserve and re-establish indigenous flora and fauna habitat, to preserve and restore connected habitat corridors and open space.
- 2.4.3.d** Utilize protection tools such as conservation easements, land trusts, land banks, Purchase of Developments Rights (PDRs), Transfer of Development Rights (TDRs), and other stewardship tools to acquire natural areas.
- 2.4.3.e** Encourage discussions with communities to designate heritage areas that protect recreational and cultural lifestyles and resources.
- 2.4.3.f** Support the expansion of Haleakalā National Park, and the creation of new national parks, where appropriate and supported by local communities.
- 2.4.3.g** Encourage reforestation efforts that increase native species' habitat.
- 2.4.3.h** Utilize the Natural Area Partnership Program (NAPP) and other programs to protect natural lands.
- 2.4.3.i** Support increased dedicated funding for the acquisition, protection, restoration, or preservation of important natural areas or open space through the following: grants from the Land and Water Conservation Fund; dedicated funding from real property taxes or other appropriate revenues; bond issues; real estate transfer tax; revenues from the

HERITAGE RESOURCES

Transient Accommodations Tax; development mitigation fees; and other appropriate funding sources.

Implementing Actions:

- 2.4.3-Action 1** Develop management plans for the reforestation of native species' habitats and institute rest periods for designated areas threatened by overuse.
- 2.4.3-Action 2** Develop an inventory of lands, and prioritize urban and rural wilderness areas that are threatened by human impacts and are strong candidates for preservation.



Aerial view of the Hāna Highway.

SCENIC RESOURCES

Maui's shoreline, tropical rainforests, rugged valleys, vast open spaces, historic towns, pastoral landscapes, and panoramic Pacific Ocean views are all a part of the island's scenic resources. In the past few decades, the island has experienced rapid growth of the visitor industry, as well as an increase in population, which have dramatically impacted the island's scenic corridors and view planes. The current network of laws established to protect scenic resources is focused on coastal lands. Areas outside of coastal lands also possess significant scenic resources that could benefit from regulatory controls and preservation strategies.

HERITAGE RESOURCES

Scenic views are public resources; they contribute to residents' everyday quality of life. The island's dramatic viewsheds and scenic horizon are part of what makes Maui a desirable place to live. There are many kinds of scenic resources and various ways to appreciate them on a daily basis. There are some views that possess notably higher significant scenic-resource value than others. State and County roadways, such as Haleakalā Highway, Honoapi'ilani Highway, Hāna Highway, Kula Highway, and Kahekili Highway, provide ocean, mountain, agricultural, and island-wide views. Roadways on Haleakalā, especially at upper elevations, offer expansive views of Central and West Maui, the islands of Moloka'i, Lāna'i, and Kaho'olawe, and the peaks of Mauna Loa and Mauna Kea on the Island of Hawai'i. Coastal roadways also provide significant views of neighboring islands, slopes of Haleakalā, and rugged valleys of the West Maui Mountains. The East Maui portion of the Hāna Highway is famous for its legendary cliff, ocean, rainforest, waterfall, and valley views.

CHALLENGES AND OPPORTUNITIES

Degradation of Scenic Resources

Scenic views are closely tied to residents' quality of life and the island's sense of place. Maui possesses unique, rare, and significant views, many of which have no equal. Many views and landscapes are closely tied to Hawaiian culture, folklore, and history.

Maui's spectacular views are a driving force behind the island's thriving visitor industry. Thus, scenic-resource preservation is an important part of protecting the health of Maui's economy.

Within highly urbanized corridors, there are exceptional and important views. These views are especially important because they provide visual relief and enhance the quality of the built environment, thereby making urban areas more livable.

The Scenic Resources Inventory and Mapping Project (2006) identifies and maps the island's scenic-resource corridors. Each roadway corridor is rated exceptional, high, medium, or low based on its overall resource value. Roadway corridors with exceptional or high scenic-resource values typically contain dramatic and diverse resource values throughout the corridor. These corridors are typically in a natural condition and remain undeveloped.



Kekaulike Highway.

Limited Access to Scenic Resources

While roadways offer vast opportunities for residents and visitors to enjoy Maui's beautiful views, other areas also contribute significantly to the island's scenic resources. Areas such as beaches and trails provide access to scenic views, some of which may not be visible from roadways.

Inappropriate Building and Landscape Design

Lands rich in scenic-resource value are often the same lands that are in high demand for recreational, resort, and residential uses. Over the past two decades, growth and development have caused some visual clutter along State and County roadways, obstructed ocean views, and produced urban and rural sprawl conditions on agricultural lands that once separated distinct country-town communities. While the visual impact of some developments may seem minimal, the cumulative impact is significant. Inappropriate architectural, site, and landscape design, as well as the massing of many coastal structures, can dramatically hamper scenic resources. Furthermore, utility poles can diminish the quality of views from many State and County roadways and create visual clutter.

Subdivision and development of Maui's agricultural and rural lands have resulted in landscapes marked by the proliferation of dwelling units that threaten visual resources.

The establishment of a Scenic Roadway Corridor Overlay District would establish special controls along scenic roadway corridors to prevent or mitigate the impact of development on scenic resources. An important component of the overlay district would be the establishment of design guidelines and a view-corridor management plan. Techniques such as development clustering, greenbelts and open-space buffers, site-plan configuration to protect view planes, building design and height limitations, setbacks from public roadways, landscaping, and other means would be incorporated into the guidelines. Any new subdivision or construction of a building that exceeds a specified height threshold and is within a Scenic Roadway Corridor viewshed would be subject to an assessment of the project's visual impact and compliance with the design guidelines.

The management plan would identify right-of-way improvements, utility controls, roadside maintenance activities, signage, potential new vehicular turn-offs, and land-acquisition opportunities that would protect the integrity of scenic resources.

The County could use the management plan and design guidelines to review site designs, development applications, and capital improvement programs to ensure that Maui's scenic roadways and resources are protected.

Loss of Agricultural and Open Lands to Development



Pi'ilani Highway.

In recent years, thousands of acres of former sugar land in the Pā'ia-Ha'ikū Community Plan Area and the West Maui Community Plan Area have been

impacted by development.

The Countywide Policy Plan, at page 74, establishes the following objective: “Improve land use management and implement a directed-growth strategy.” An island-wide directed-growth strategy can help protect Maui’s scenic resources. A directed-growth strategy can utilize principles such as open-space preservation, agricultural land protection, green belts, and a compact settlement form that will help to minimize the encroachment of urban development into rural areas.

SUMMARY OF SCENIC RESOURCES ISSUES

- Loss or degradation of scenic resources that are a part of the island’s shared quality of life
- Access to scenic resources
- Inappropriate building massing, architecture, siting, and landscape design
- Loss of agricultural and open lands to development

GOAL, OBJECTIVES, POLICIES, AND ACTIONS

Goal:

- 2.5** Maui will continue to be a beautiful island steeped in coastal, mountain, open space, and historically significant views that are preserved to enrich the residents’ quality of life, attract visitors, provide a connection to the past, and promote a sense of place.

Objective:

- 2.5.1** A greater level of protection for scenic resources.

Policies:

- 2.5.1.a** Protect views to include, but not be limited to, Haleakalā, `Īao Valley, the Mauna Kahalawai (West Maui Mountains), Pu`u Ō`la`i, Kaho`olawe, Molokini, Moloka`i, and Lāna`i, Mauna Kea, Mauna Loa, sea stacks, the Pacific Ocean, and significant water features, ridgelines, and landforms.
- 2.5.1.b** Identify, preserve, and provide ongoing management of important scenic vistas and open space resources, including mauka-to-makai and makai-to-mauka view planes.
- 2.5.1.c** Protect “night sky” resources by encouraging the implementation of ambient light ordinances and encouraging conversion of all sources that create excessive light pollution, affecting our ability to view the stars.
- 2.5.1.d** Protect ridgelines from development where practicable to facilitate the protection of public views.
- 2.5.1.e** Protect scenic resources along Maui’s scenic roadway corridors.

HERITAGE RESOURCES

Implementing Actions:

- 2.5.1-Action 1** Adopt a Scenic Roadway Corridor Overlay District to establish special controls to mitigate the impact of development on scenic resources.
- 2.5.1-Action 2** Establish a Scenic Roadway Corridor Management Plan and Design Guidelines to guide the development within the Overlay District.
- 2.5.1-Action 3** Adopt a management plan that identifies right-of-way improvements, utility controls, roadside maintenance activities, signage, potential new vehicular turnoffs, and land acquisition opportunities that would protect the resource.
- 2.5.1-Action 4** Establish design guidelines that integrate techniques such as development clustering, greenbelts, and open space buffers, site plan configuration to protect view planes, building design and height limitations, setbacks from public roadways, landscaping, and other techniques.
- 2.5.1-Action 5** Create thresholds for new subdivision of land or building permit which is within a Scenic Roadway Corridor viewshed (as mapped by the County) to make them subject to assessment of the projects visual impact and compliance with the design guidelines.
- 2.5.1-Action 6** The County shall use the management plan and design guidelines to review site designs, development applications, and capital improvement programs to ensure that they do not degrade Maui's scenic roadways and resources.
- 2.5.1-Action 7** Develop and adopt standards to protect ridgelines, slopes, and view planes from development.
- 2.5.1-Action 8** Develop and adopt regulations to protect night-sky resources from encroachment by the built environment, and limit night-light emissions and light-intensity levels.

Objective:

- 2.5.2** Reduce impacts of development projects and public-utility improvements on scenic resources.

Policies:

- 2.5.2.a** Enforce the policies and guidelines of the SMA regarding the protection of views.
- 2.5.2.b** Require any new subdivision of land, development, or redevelopment adjacent to a "high" or "exceptional" scenic corridor to submit an impact assessment of the project's scenic impacts; this assessment shall use the avoidance, minimization, and mitigation steps respectively, with an emphasis on avoidance.
- 2.5.2.c** Require appropriate building setbacks and limits on wall heights to protect views along scenic corridors.

HERITAGE RESOURCES

- 2.5.2.d** Encourage the State of Hawai'i Board of Land and Natural Resources to deny any development within the State Conservation District that interferes with a scenic landscape or disrupts important open space resources.
- 2.5.2.e** Require Urban Design and Review Board (UDRB) review and approval of utility poles, facilities, and other visible infrastructure improvements along scenic corridors.
- 2.5.2.f** Ensure little or no effect on scenic resources from utility improvements, primarily power poles.
- 2.5.2.g** Protect scenic vistas from intrusion by power poles.

Implementing Actions:

- 2.5.2-Action 1** Develop, adopt, and implement a Scenic Resources Management Plan and design guidelines.
- 2.5.2-Action 2** Develop and adopt an ordinance that requires Scenic Resource Impact Assessments for projects that may have potential impact on scenic resources.
- 2.5.2-Action 3** Develop and adopt standards and processes to:
- (1) Ensure that the location and design of utility poles, facilities, and infrastructure do not degrade scenic resources;
 - (2) Require utilities to be placed underground, whenever feasible; and
 - (3) Require UDRB to review and approve the installation of utilities along scenic corridors.

Objective:

- 2.5.3** Greater protection of and access to scenic vistas, access points, and scenic lookout points.

Policies:

- 2.5.3.a** Protect, enhance, and acquire access to Maui's scenic vistas and resources.

Implementing Actions:

- 2.5.3-Action 1** Revise land use regulations to:
- (1) Require access, where appropriate, to scenic vistas and resources, provided such access is culturally acceptable;
 - (2) Limit the height of walls; and
 - (3) Require appropriate setbacks and site design along scenic corridors.
- 2.5.3-Action 2** Develop additional Scenic Lookout points.